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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/040,420	01/09/2002	Radislav Alexandrovich Potyrailo	RD-28007	3542
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GENERAL ELECTRIC COMPANY GLOBAL RESEARCH CENTER PATENT DOCKET RM. 4A59 PO BOX 8, BLDG. K-1 ROSS NISKAYUNA, NY 12309			EXAMINER BARBEE, MANUEL L	
			ART UNIT 2857	PAPER NUMBER

DATE MAILED: 10/10/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/040,420

Applicant(s)

POTYRAILO ET AL.

Examiner

Manuel L. Barbee

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2002.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-92 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-41 and 46-92 is/are rejected.
- 7) ☒ Claim(s) 42-45 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 January 2002 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The information disclosure statement filed 2 January 2002 contains a reference by Vandeginste et al., which fails to comply with 37 CFR 1.98(a)(2), which requires a legible copy of each U.S. and foreign patent; each publication or that portion which caused it to be listed; and all other information or that portion which caused it to be listed. The information disclosure statement and the specification cite pages 535-553 of the Vandeginste reference. Copies of pages 135-153 were received, however, copies of pages 535-553 were not received. The information disclosure statement has been placed in the application file, but the Vandeginste et al. reference has not been considered.

Drawings

2. The drawings are objected to because in Figure 1, step 80, "shorter" should be --larger--, as shown on page 24, paragraph 92 of the specification. In Figure 4, "108" should be --118-- for the emitted radiation, as shown on page 28, paragraph 102 of the specification. A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Specification

3. The disclosure is objected to because it contains an embedded hyperlink and/or other form of browser-executable code on page 19, paragraph 75. Applicant is required

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to delete the embedded hyperlink and/or other form of browser-executable code. See MPEP § 608.01.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

5. Claims 1, 5, 7, 12, 13, 17, 21-24, 26-30, 34, 36, 41, 46, 50, 57-61, 63-65, 67, 68, 72, 74, 76-78, 82-89, 91 and 92 are rejected under 35 U.S.C. 102(a) as being anticipated by Anand et al. (US Patent No. 6,411,089).

With regard to collecting analytical data from a sample using a first integration time and applying a mathematical transform to the data to achieve a pre-determined signal quality obtained when the sample is analyzed without mathematical transform analysis using a second integration time that is larger than the first integration time, as shown in claims 1, 30 and 68, Anand et al. teach collecting data from a sample using magnetic resonance and using a Fourier transform on the data to analyze the data with less scan time and with a higher signal to noise ratio (col. 1, lines 8-15, col. 1, line 55 - col. 3, line 12. esp. col. 3, lines 11 and 12). The signal to noise ratio corresponds to the predetermined signal quality.

With regard to continuous transform analysis and Fourier transform analysis, as shown in claims 5, 7, 34, 36, 72 and 74, Anand et al. teach Fourier transform analysis (col. 7, lines 25-45). With regard to determining parameters of the mathematical

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transform during analysis, as shown in claims 12, 41 and 76, Anand teach forming the data set for the Fourier transform during analysis (col. 7, lines 25-45). With regard to the signal quality comprising a signal parameter such as signal-to-noise ratio, as shown in claims 13, 17, 46, 50, 77 and 78, Anand et al. teach signal-to-noise ratio (col. 3, lines 11, 12). With regard to the analytical data comprising a first-order array or a second-order or higher array, as shown in claims 21, 22, 57, 58, 85 and 86, Anand et al. teach analyzing a three-dimensional object (col. 4, lines 12-31). With regard to sensor or scanning data, as shown in claims 23, 60 and 88, and magnetic resonance, as shown in claims 24, 61 and 89, Anand et al. teach magnetic resonance imaging (col. 1, lines 8-15).

With regard to electromagnetic radiation in the range from .05 Angstroms to 500 millimeters, as shown in claims 26, 63 and 91, Anand et al. teach using magnetic resonance imaging (col. 1, lines 8-15). With regard to a sample of organic material, as shown in claims 27 and 64, and measuring a parameter in the range of a single molecule up to 100% of the sample, as shown in claims 28 and 65, Anand teach magnetic resonance imaging, which is used to measure parameters of humans and to measure parameters which are a some part of the sample (col. 1, lines 8-15). With regard to software code, as shown in claims 29, 67 and 92, Anand et al. teach a processor for performing the analysis method (col. 7, lines 25 - col. 8, line 3).

With regard to simultaneous evaluation of individual samples in an array, as shown in claims 59 and 87, Anand et al. teach simultaneous sampling and evaluation, col. 6, line 61 - col. 8, line 3). With regard to at least one energy source interacting with

the sample, as shown in claim 82, and a radiation source, as shown in claim 83, and an imaging camera, as shown in claim 84, Anand et al. teach magnetic resonance imaging which sends pulses of radiation into the sample and includes a detector to detect the interaction and form an image (col. 1, lines 8-15).

Claim Rejections - 35 USC § 103

6. Claims 2, 3, 31, 32, 69 and 70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al. in view of Beebe et al. (Chemometrics: A Practical Guide).

Anand et al. teach all the limitations of claim 1 upon which claims 2 and 3 depend, claim 30 upon which claims 31 and 32 depend, and claim 68 upon which claims 69 and 70 depend. Anand et al. do not teach multivariate analysis, as shown in claims 2, 3, 31, 32, 69 and 70. Beebe et al. teach multivariate analysis including least squares analysis and principal components analysis (page 6, page 278-280). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the magnetic resonance imaging (MRI) method, as taught by Anand et al., to include multivariate analysis, as taught by Beebe et al., because then the model becomes more sensitive to the detection of unusual samples (Beebe et al., page 279).

7. Claims 4, 8-10, 33, 37-39, 71 and 75 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al. in view of Abdel-Malek et al. (US Patent No. 5,497,777).

Anand et al. teach all the limitations of claim 1 upon which claims 4 and 8-10 depend, claim 30 upon which claims 33 and 37-39 depend, and claim 68 upon which

claims 71 and 75 depend. Anand et al. do not teach discrete transform analysis, as shown in claims 4, 33 and 71. Anand et al. do not teach the wavelet transform, a wavelet de-noising algorithm, or a wavelet filter, as shown in claims 8-10, 37-39 and 75. Abdel-Malek et al. teach discrete wavelet transform analysis (Abstract, col. 5, lines 18-27). Abdel-Malek et al. teach wavelet transform analysis a noise filter using wavelet components (col. 2, lines 25-63). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MRI method, as taught by Anand et al., to include wavelet analysis and de-noising, as taught by Abdel-Malek, because then images would have been enhanced and noise that is signal dependent would have been removed (Abdel-Malek, col. 1, lines 1-21).

8. Claims 6, 35 and 73 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al. in view of Grangeat et al (US Patent No. 6,103,350).

Anand et al. teach all the limitations of claim 1 upon which claim 6 depends, claim 30 upon which claim 35 depends and claim 68 upon which claim 73 depends. Anand et al. do not teach smoothing analysis, as shown in claims 6, 35 and 73. Grangeat et al. teach using smoothing analysis to restore images of a noisy moving object (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MRI method, as taught by Anand et al., to include smoothing analysis, as taught by Grangeat et al., because then moving objects would have been more clearly imaged (Grangeat et al. col. 1, lines 10-22).

9. Claims 11 and 40 rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al. in view of Abdel-Malek (US Patent No.5,497,777) as applied to claims 1, 8, 9, 30, 37 and 38 above, and further in view of Abdel-Malek (US Patent No. 5,619,998).

Anand et al. and Abdel-Malek et al. '777 teach all the limitations of claim 9 upon which claim 11 depends and claim 38 upon which claim 40 depends. Anand et al. and Abdel-Malek et al. '777 do not teach de-noising using a threshold/shrinkage method, as shown in claims 11 and 40. Abdel-Malek et al. '998 teach using a wavelet analysis with nonlinear thresholding to remove noise from a data (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify MRI combination, as taught by Anand et al. and Abdel-Malek '777, to include removing noise using thresholding, as taught by Abdel-Malek '998, because then another method of noise removal would have been available.

10. Claims 14, 47 and 79 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al. in view of Ahuja et al. (US Patent No. 5,740,036).

Anand et al. teach all the limitations of claims 1 and 13 upon which claim 14 depends and claims 30 and 46 upon which claim 47 depends and claims 68 and 77 upon which claim 79 depends. Anand et al. do not teach that one of the signal parameters is signal resolution, as shown in claims 14, 47 and 79. Ahuja et al. teach analyzing data using resolution (col. 2, lines 61-64). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MRI method, as taught by Anand et al., to include measuring resolution, as taught by Ahuja et al., because then signal data would have had optimum precision.

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11. Claims 15, 16, 48, 49, 80 and 81 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al. in view of Sano et al. (US Patent No. 5,115,812).

Anand et al. teach all the limitations of claims 1 and 13 upon which claims 15 and 16 depend and claims 30 and 46 upon which claims 48 and 49 depend and claims 68 and 77 upon which claims 80 and 81 depend. Anand et al. do not teach that the signal parameter is peak shift, as shown in claims 15, 48 and 81, or signal distortion, as shown in claims 16, 49 and 80. Sano et al. teach minimizing the peak shift in a MRI method (Abstract). Peak shift appears to be a type of distortion. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify MRI method, as taught by Anand et al., to include minimizing peak shift, as taught by Sano et al., because then phase distortions would have been minimized (Sano et al. Abstract).

12. Claims 18-20 and 51-53 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al.

Anand et al. teach all the limitations of claims 1, 13 and 17 upon which claims 18-20 depend and claims 30, 46 and 50 upon which claims 51-53 depend. Anand et al. do not teach that the signal-to-noise ratio ranges from 3 to 1000, as shown in claims 18-20 and 51-53. The Examiner takes official notice that it is well known to increase the signal-to-noise ratio to a value of 3 or more. It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MRI method, as taught by Anand et al., to include a signal-to-noise ratio of 3 or more, because then information in the signal would have been more accurately measured.

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13. Claims 25, 62 and 90 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al. in view of Ried et al. (US Patent Application Publication 2001/0053958).

Anand et al. teach all the limitations of claims 1 and 23 upon which claim 25 depends, claims 30 and 60 upon which claim 62 depends and 68 and 88 upon which claim 90 depends. Anand et al. do not teach measurements made using any type of microscopy, as shown in claims 25, 62 and 90. Ried et al. teach making measurements using microscopy (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MRI method, as taught by Anand et al., to include making measurements using microscopy, as taught by Ried et al., because then genetic markers would have been detected (Ried et al., Abstract).

14. Claims 54-56 are rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al. in view of Leusenکو et al. (SU 587458 A).

Anand et al. teach all the limitations of claim 30 upon which claims 54-56 depend. Anand et al. do not teach an improvement in integration time from 1.5 to 200 fold, as shown in claims 54-56. Leusenکو et al. teaches reducing integration time by half (Abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MRI method, as taught by Anand et al. to include improving the integration time by two fold, as taught by Leusenکو et al., because then analysis would have taken less time.

15. Claim 66 is rejected under 35 U.S.C. 103(a) as being unpatentable over Anand et al. in view of Cescon et al. (US patent No. 3,615,454).

Anand et al. teach all the limitations of claim 30 upon which claim 66 depends. Anand et al. do not teach a sample comprising polycarbonate, as shown in claim 66. Cescon et al. teach a sample containing polycarbonate (col. 24, lines 33-77). It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the MRI method, as taught by Anand et al., to include a sample containing polycarbonate, as taught by Cescon et al., because then it would have been possible to measure properties of radiation sensitive materials (Cescon et al., col. 1, lines 10-28).

Allowable Subject Matter

16. Claims 42-45 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

17. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Miyazaki et al. (US Patent No. 5,704,357) teach producing an MR image.

Funk et al. (US Patent No. 6,031,609) teach a Fourier transform spectrometer.

Cline et al. (US Patent Application Publication 2002/0002331) teach MR imaging.

King (US Patent Application Publication 2002/0171422) teaches a calibration method for MRI acquisition.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Manuel L. Barbee whose telephone number is 703-308-0979. The examiner can normally be reached on Monday-Friday from 8-4:30.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Marc S. Hoff can be reached on 703-308-1677. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-0976.

mlb


MARC S. HOFF
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